SIEMENS

R630/R640; M440/M450

TD

Troubleshooting Guide

System

CELSIUS Workstation

Document revision level

The document corresponds to the version/revision level effective at the time of system delivery. Revisions to hardcopy documentation are not automatically distributed.

Please contact your local Siemens office to order current revision levels.

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Scope and purpose

This document describes the hardware troubleshooting procedure for Celsius R630/R640 and M440/M450 computers using the BIOS functionality and the "DIFS16P (Diagnosis Inventory Feedback in Service 16 bit)" PC diagnostic SW.

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Use of storage media

NOTE	**Use medical grade CD-Rs and DVD-Rs only.**
	Medical grade media are available through the Siemens representative.
	For further information about the handling of storage media, see the corresponding Operator Manual of the system.

Requirements

Service on Celsius R630/R640 and M440/M450 systems may be performed only by CSEs who have:

- completed a product training course which has the Celsius PC component included or a web based training for Celsius PCs.
- "DIFS16P" HW diagnostic SW, available as service tool at CSML Stock (P/N: 102 81 993, DIFS PC test tool).
- Standard service tool kit.
- Replacement of parts:
  - TD00- 400.841.01... (for R630)
  - TD00- 400.841.10... (for R640)
  - TD00- 400.841.40... (for M440/M450)
- Static Dissipative Field Service Kit.

About PC test software DIFS16P

The DIFS16P PC (Diagnosis Inventory Feedback in Service 16 bit) diagnostic tool is a SW-independent tool to check the PC hardware.

It is self booting from CD, and has its own operating system.

A "Burn-In Test" is possible.

Predefined test scripts are defined for a "Quick Test".

Test results are not intended to be stored on PC or other removable devices.

NOTE	**The goal of the tests featured by this tool is to decide whether to:**
	• **Change single HW components**
	• **Change the complete HW**
	• **Reload SW on the existing HW**

DIFS16P can be controlled by mouse or keyboard.

To navigate with the keyboard, use the arrow keys or the highlighted hotkeys which are activated by the "Alt"-Key (in DIAGNOSIS Configure, for example: to set the level of a test to level 2 use the combination Alt+2).

To switch between the navigation and the worktop use the left and right arrow keys.

Levels

The Test and Diagnosis Tool DIFS16P has 4 major characteristics.

⇨ It provides information about the hardware inventory and it offers testing and diagnosis functionality in different degrees of inspection.

⇨ It offers a short, general test suite named "Level 1" to help you find out which component is defective, checking basic functionality.
This level has a maximum duration of 5 minutes (hardware dependent).

⇨ It offers another test suite named "Level 2," whose purpose is to test at a higher degree of inspection.
This level is quality oriented and therefore takes more time.

⇨ You can also choose "Level 3" in the "Configured Diagnosis," which tests at the deepest level.
To run a test several times, you can specify "Cycles" in the "Configured Diagnosis" menu.

Integrated diagnosis modules

System board

Analyzes runtime, post or other error logs via BIOS

Real time clock

Analyses the real time clock

System monitoring

Thermal control and fan diagnostics

Processor

Processor diagnostic: this operates with a number of different mathematical functions

Memory

Memory/second level cache test:

Level 1 is configured to run a maximum of 5 min in butterfly test mode.

Level 2 is configured to run on 100% of the memory with the butterfly test and the random sequence test.

Level 3 is configured to run on 100% of the memory with the alternate block test, line bounce test, random block test, random address test, butterfly test, and random sequence test.

Graphics

Checks the video memory chips with several patterns.

Hard disk

Read-only test for IDE and SCSI hard disk drives.

Level 1 is configured to run for a maximum of 2 min of reading.

Level 2 makes a 20-minute read test and then starts the smart self test.

Level 3 is configured to run on 100% of the hard disks. It starts the smart, short, and extended tests.

Optical drives

CD/DVD test, using MSCDEX (IDE and SCSI).

Mouse

Diagnostic for PS2/USB mouse via reset/enable/disable/interface-test.

Serial and parallel port

Serial/parallel port register diagnostics

Firewire IEEE 1394

Tests communication with all firewire devices attached.

Keyboard

Diagnostic for PS2/USB keyboard via reset/enable/disable/interface-test.
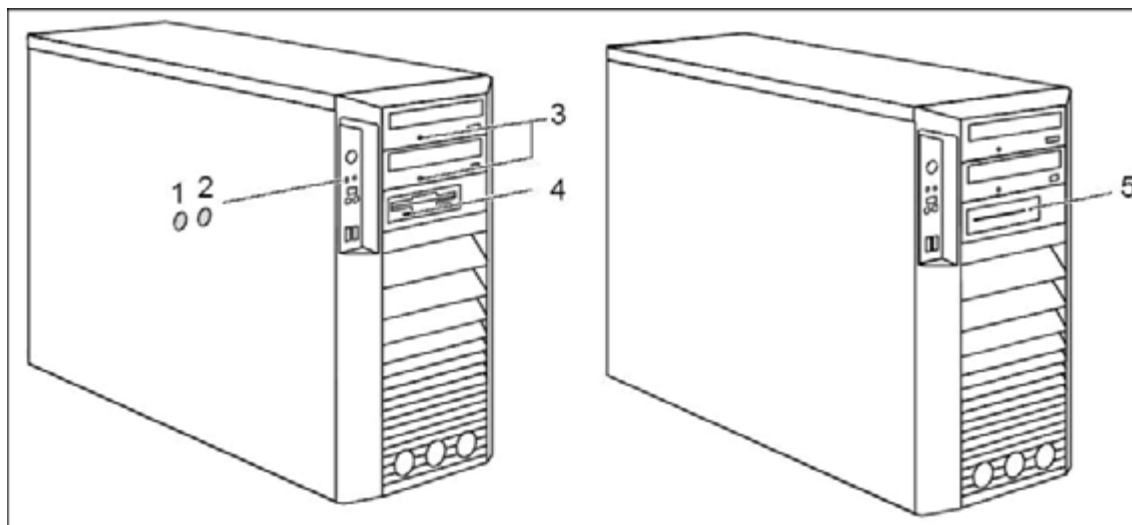
LAN adapter

Uses 3rd-party LAN test tool of the LAN chip manufacturer to test the LAN adapters.

USB inventory check

On supported hardware, the connected USB devices are shown in the "Current Inventory".

The indicators are found on the front of the housing.

Which indicators are installed on your device depends on the configuration level you have selected.

Fig. 1:   *R640, M440, M450 indicators*

Pos. 1   Hard disk indicator

Pos. 2   Power-on indicator

Pos. 3   Drive indicator, e.g. DVD

Pos. 4   Floppy disk indicator (optional)

Pos. 5   SmartCard reader indicator (optional)
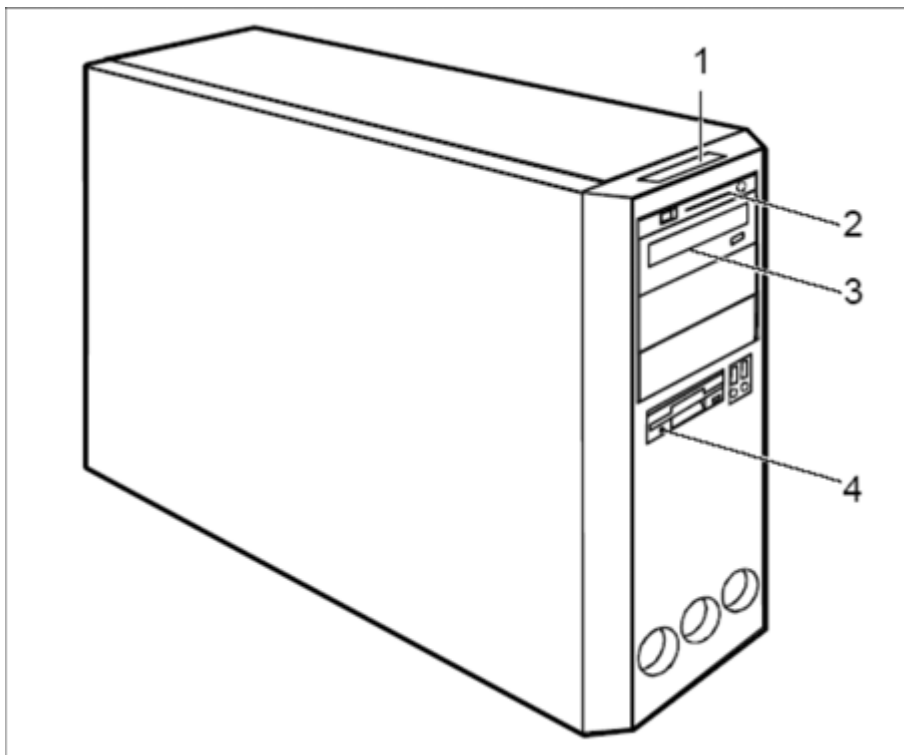
Fig. 2: R630_Indicators

Pos. 1   LCD / status indicator panel

Pos. 2   SmartCard reader indicator

Pos. 3   CD-ROM indicator

Pos. 4   Floppy disk indicator

Hard disk indicator

This indicator lights up when the hard disk drive of the device is accessed.

Power-on indicator

The indicator lights up green:

⇨ The device is switched on.

NOTE	**The display can also light up green if the device has been switched off by holding the ON/OFF switch (see "Trouble-shooting and tips").**

The indicator lights up orange:

⇨ The device is ready to operate or in energy-saving mode. When the power button is switched on, the device switches on or returns to the state it was in before the energy-saving mode.

NOTE	**When the device is in energy-saving mode, it must not be disconnected from the mains supply or data loss may result.**

The indicator does not light up:

⇨ The device is switched off.

Drive indicator, e.g. DVD

The indicator lights up when the CD-ROM or DVD drive is accessed. You may only remove the CD or DVD when the indicator is dark.

Floppy disk indicator (optional)

The indicator lights up when the floppy disk drive of the device is accessed. You may only remove the floppy disk when the indicator is unlit.

BIOS settings for booting the DIFS tool from the PC

To run the DIFS tool, you need to boot the computer from CD. To do so, you must change the boot sequence in the BIOS.

- Boot the computer.
- During the BIOS routine, press the F2 button.
    - ⇨ The system will ask for the BIOS password.
- Enter the password, according to the password list of your modality (to be found in the knowledge database).
    - ⇨ The "BIOS Setup Utility" window appears.

Depending on your system, set the boot sequence as follows:

Setting the boot sequence on R640/R630

- Select the "Boot" menu and then "Boot Device Priority". Press Enter.
    - ⇨ The boot device list will appear.
- Take note of the boot devices, so that you can change back to the original BIOS setting after the test is finished.
- According to the Help text on right side of the screen, set the CD/DVD ROM as the "First Boot Device".
- Press the F10 button to save.
    - ⇨ You will be asked to "SAVE to CMOS and EXIT"
- Approve with 'y' and press Enter.
    - ⇨ The computer will reboot automatically, using the new BIOS settings.

NOTE	**Now you can run the DIFS tool by booting from CD.**
	When you have finished with the DIFS tool, don't forget to reset the BIOS back to the original settings (Changing back to the original BIOS settings / p. 19)!

Setting the boot sequence on M440/M450

- Select "Boot Options" in the Main menu. Press Enter.
- Select "Boot Sequence". Press Enter.
    - ⇨ The boot sequence list will appear.
- Take note of the boot devices, so that you can change back to the original BIOS setting after the test is finished.
- According to the Help text on right side of the screen, set the CD/DVD ROM as the "First Boot Device".
- Press ESC twice to go back to the main menu. Go to the "Exit" menu and select "Save and exit". Press Enter.
    - ⇨ You will be asked to "SAVE to CMOS and EXIT"

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- Approve with 'y' and press Enter

    ⇨ The computer will reboot automatically, using the new BIOS settings.

NOTE	**Now you can run the DIFS tool by booting from CD.**
	When you have finished with the DIFS tool, don't forget to reset the BIOS back to the original settings (Changing back to the original BIOS settings / p. 19)!

Changing back to the original BIOS settings

- Reboot the computer
- During the BIOS routine, press the F2 button
  - ⇨ The system will ask for the BIOS password.
- Enter the password, according to the password list of your modality (to be found in the knowledge database).
  - ⇨ The "BIOS Setup Utility" window appears.

Depending on your system, set the boot sequence back to the original settings as follows:

Setting the boot sequence on R640/R630

- Select the "Boot" menu and then "Boot Device Priority". Press Enter.
  - ⇨ The boot device list will appear.
- According to the Help text on right side of the screen, set the the boot device back to the original setting you noted previously.
- Press the F10 button to save.
  - ⇨ You will be asked to "SAVE to CMOS and EXIT"
- Approve with 'y' and press Enter
  - ⇨ The computer will reboot automatically, using the new BIOS settings.

Setting the boot sequence on M440/M450

- Select "Boot Options" in the Main menu. Press Enter.
- Select "Boot Sequence". Press Enter.
  - ⇨ The boot sequence list will appear.
- According to the Help text on right side of the screen, set the the boot device back to the original setting you noted previously.
- Press ESC twice to go back to the main menu. Go to the "Exit" menu and select "Save and exit". Press Enter.
  - ⇨ You will be asked to "SAVE to CMOS and EXIT".
- Approve with 'y' and press Enter.
  - ⇨ The computer will reboot automatically, using the new BIOS settings.

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Information about fans, power supply and lithium battery

Depending on your system, you can obtain this information as follows:

R630/R640

- Reboot the computer
- During the BIOS routine, press the F2 button.
  - ⇨ The system will ask for the BIOS password.
- Enter the password, according to the password list of your modality (to be found in the knowledge database).
  - ⇨ The "BIOS Setup Utility" window appears.
- Go to the "Advanced" menu, select "Hardware Monitoring", and press Enter. Then select "Realtime sensors" and press Enter.
  - ⇨ An information screen will appear.

Fans

Check to make sure that all fans listed are running. An "RPM" value must be shown. Visually check any fan for which this information is not shown. The RPM value depends on the temperature and can vary.

Power supply

Check the value for VCC 5V and VCC 12V for R640, or the WB 5V, WB -12V and WB 12V. The permissible range is ±5%. If the system is unstable and this range is exceeded, the power supply is probably defective.

Lithium battery

Check the value for the battery. If the value is less than 3 V, replace the battery.

NOTE	**To exit the BIOS, go to the EXIT menu and select "Quit without saving".**

M440 / M450

- Reboot the computer
- During the BIOS routine, press the F2 button.
  - ⇨ The system will ask for the BIOS password.
- Enter the password, according to the password list of your modality (to be found in the knowledge database).
  - ⇨ The "BIOS Setup Utility" window appears.

- Go to the "Advanced" menu, select "System Management", and press Enter.
  - ⇨ An information screen will appear.

Fans

The status of all fans should be "OK".

Power supply

The status should be "OK".

Lithium battery

The status for "Battery state" should be "OK".

NOTE	**To leave the BIOS, go to the "EXIT" menu and select "Quit without saving".**

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Starting the DIFS tool

Boot the PC from the DIFS-CD.

If the DIFS tool asks for a report file, press <return>. There is no need to save a report file.

After booting, the DIFS tool shows the hardware inventory of the machine (see (Fig. 3 / p. 22) as an example for a Celsius).

Fig. 3:   SC1 - The inventory screen shows information about the current hardware

Run diagnosis level 1

By choosing the diagnosis in "Level1", the computer will be tested within approx. 5 minutes .

Fig. 4: SC2 - Diagnosis is running

Fig. 5: SC3 - Result of the diagnosis with details about the fault detected

DIFS then shows the result of the diagnosis with ECS code, the location of the error, and additional details of the failure .

If a defect couldn't be found in "Level1", select the "Level2" menu item on the left-hand panel for further tests.

Run diagnosis level 2

By choosing the diagnosis in "Level2", the computer will be tested within approx. 30 minutes.
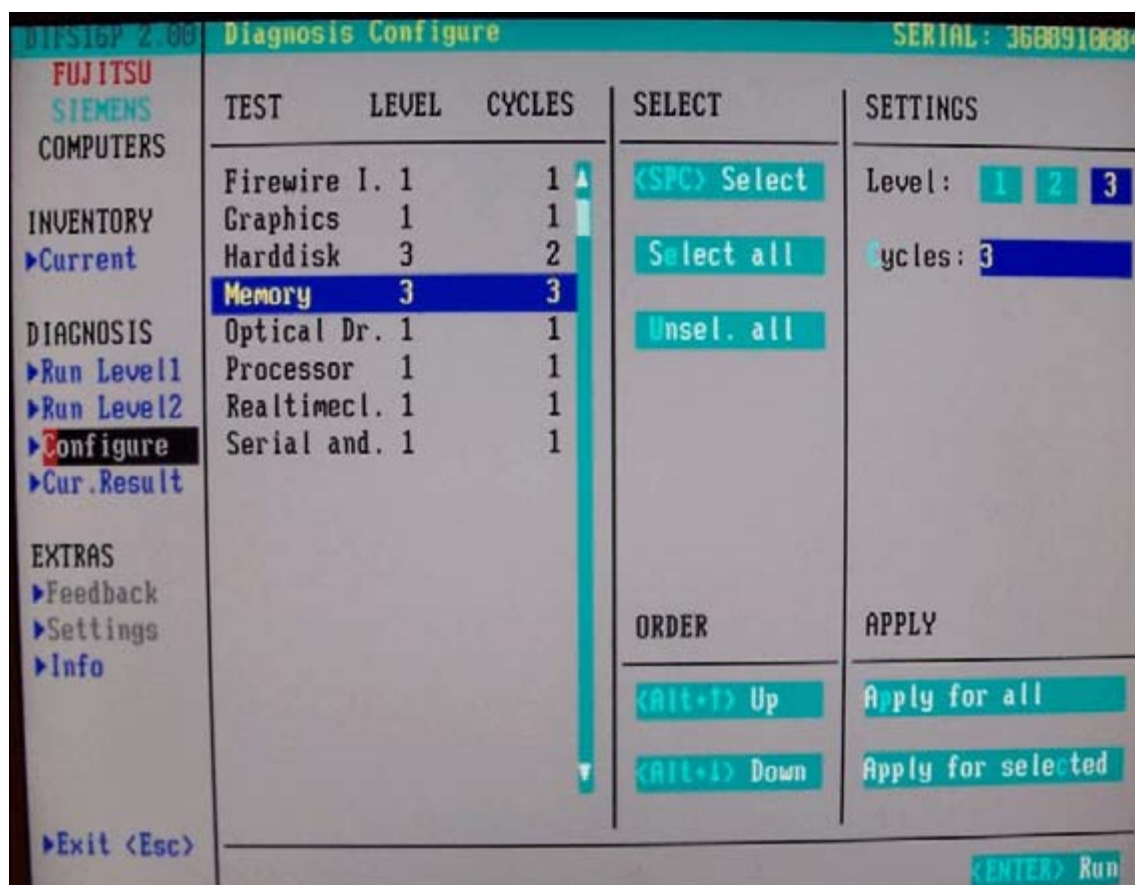
Fig. 6:   SC4 - Test and level selection for a user-configured diagnosis

"Level 2" scans more deeply than "Level1" but is more time consuming.

DIFS then shows the result of the diagnosis with ECS-Code, the location of the error, and additional details of the failure.

If a defect could not be found in "Level2", you can also select a single test in the Diagnosis/Configure dialog (Fig. 6 / p. 24). This test takes a minimum of one hour and can be set to run repeatedly.

Evaluation of the results

If the DIFS tool detects a defective part that is available as a spare part, order the part and verify the results.

If the DIFS tool detects a defective part that is not available as a spare part, order the entire PC and verify the results.

After hardware repair, verification must be made by an additional diagnosis run on the same level as that on which the error was found. The verification step must be made even if the DIFS tool does not find an error or the tool could not be used in the diagnosis step.

Known issues in troubleshooting the Celsius PCs

Defective hard disk not detected by DIFS

Sometimes DIFS is not able to detect a defective hard disk. But you can check the hard disks during the boot operation. Press the "Pause" button when the following screen is shown (just an example).

Fig. 7:   Defective hard disk

In this example, hard disks 1 to 3 (ID 0 to 2) are defective.

BIOSLOG-Errors

BIOSLOG-Errors are logged failures which have appeared in the past. These errors don't indicate an already existent problem. They only should be handled as a hint to the may defective component.
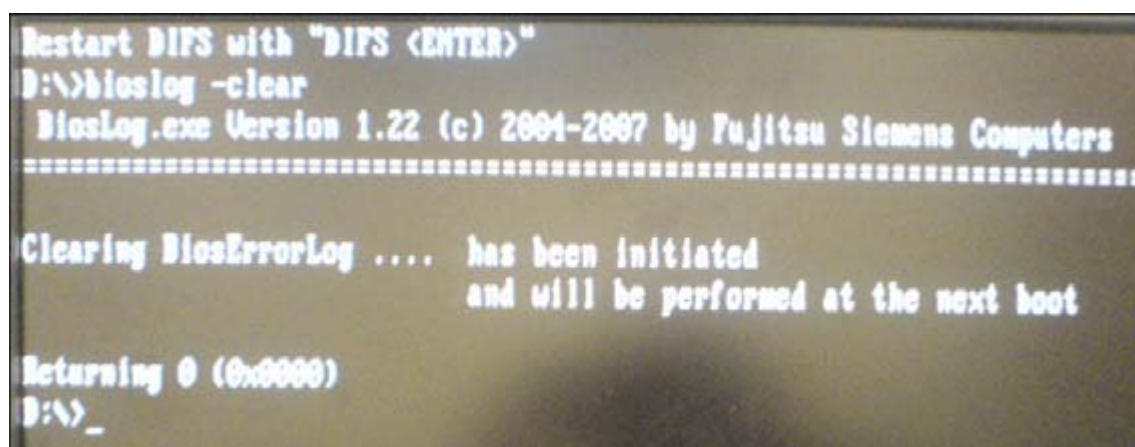

Fig. 8:   Clear BIOSLOG

To clear the BIOSLOG-Errors please go to the FreeDOSPrompt of the DIFS-Medium and type "bioslog –clear". Restart the PC and run DIFS again.

General

These service instructions describe how to clean and dust the inside of Celsius workstation housings to prevent the risk of overheating due to insufficient cooling air supply.

Important notes on installing and removing boards and components

NOTICE	**Before removing any individual modules:**

➪ **Always switch the unit off first and disconnect it from the mains supply.**

➪ **The workplace must be designed in accordance with the guidelines of the European Federation of Trade Unions.**

➪ **Only professional quality tools may be used.**

- Switch the unit off and pull the power plug out of the mains socket.
- Never use sharp objects such as screwdrivers, scissors or knives to remove covers.

NOTICE	➪ **Boards with electrostatic sensitive devices (ESD) are marked with the label shown at left.**

NOTICE	**When you handle boards fitted with ESDs, you must, under all circumstances, observe the following points:**

➪ **You must statically discharge yourself before working with boards (e.g. by touching a grounded object).**

➪ **The equipment and tools you use must be free of static charges.**

➪ **Remove the power plug from the mains supply before inserting or removing boards containing ESDs.**

➪ **Always hold boards with ESDs by their edges.**

➪ **Never touch pins or conductors on boards fitted with ESDs.**

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Preparatory work steps

- De-energize workstation by removing the power plug from the mains supply.
- The service technician must connect himself to the workstation with a suitable grounding strap.

  Electrostatic charging caused by the air flow of the vacuum cleaner must be avoided.
- Remove the side panel.
- Remove air duct(s).

Procedure

- Disconnect, remove and clean fan separately, if possible.
- Remove all visible fluff with the vacuum cleaner.
- Check whether the vanes on the heat sinks and heat pipes are free of contamination.
- Subsequently remove any loose remains with the vacuum cleaner.
- Reinstall fan after cleaning.
- Reinstall air duct.
- Close side panel.
- Plug in power supply.
- Switch on, boot, and test the system.

Special notes

- Do not touch electronic components with the nozzle. There is a risk of damage!

- Use only vacuum cleaners with adjustable power settings. Start with minimum power. If the result is not satisfactory, slowly increase the power level.

- Be extremely careful with the inside cables so that these are not accidentally pulled from their sockets.

Changes to previous version

New section "BIOSLOG-Errors" in chapter "Troubleshooting with DIFS16P"